New algorithm will prevent misidentification of cancer cells

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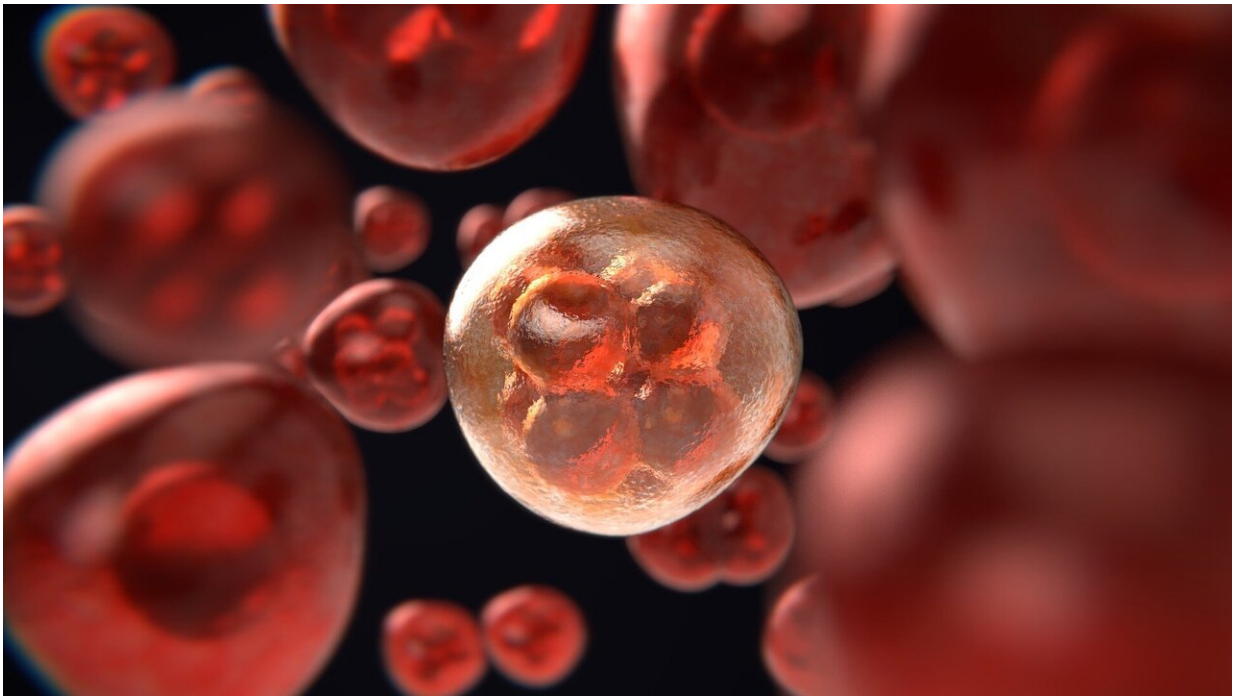

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Researchers from the University of Kent have developed a computer algorithm that can identify differences in cancer cell lines based on microscopic images, a unique development towards ending misidentification of cells in laboratories.

Cancer cell lines are cells isolated and grown as cell cultures in

laboratories for study and developing anti-cancer drugs. However, many cell lines are misidentified after being swapped or contaminated with others, meaning many researchers may work with incorrect cells.

This has been a persistent problem since work with cancer cell lines began. Short tandem repeat (STR) analysis is commonly used to identify cancer cell lines, but is expensive and time-consuming. Moreover, STR cannot discriminate between cells from the same person or animal.

Based on microscopic images from a pilot set of cell lines and utilizing computer models capable of 'deep learning," researchers from Kent's School of Engineering and Digital Arts (EDA) and School of Computing (SoC) trained the computers through a period of mass comparison of cancer cell data. From this, they developed an algorithm allowing the computers to examine separate microscopic digital images of cell lines and accurately identify and label them.

This breakthrough has the potential to provide an easy-to-use tool that enables the rapid identification of all cell lines in a laboratory without expert equipment and knowledge.

This research was led by Dr. Chee (Jim) Ang (SoC) and Dr. Gianluca Marcelli (EDA) with leading cancer cell lines experts Professor Martin Michaelis and Dr. Mark Wass (School of Biosciences).

Dr. Ang, Senior Lecturer in Multimedia/Digital Systems, said, "Our collaboration has demonstrated tremendous results for potential future implementation in laboratories and within cancer research. Utilizing this new algorithm will yield further results that can transform the format of cell identification in science, giving researchers a better chance of correctly identifying cells, leading to reduced error in cancer research and potentially saving lives.

"The results also show that the computer models can allocate exact criteria used to identify cell lines correctly, meaning that the potential for future researchers to be trained in identifying cells accurately may be greatly enhanced too."

More information: Deogratias Mzurikwao et al, Towards image-based cancer cell lines authentication using deep neural networks, *Scientific Reports* (2020). DOI: 10.1038/s41598-020-76670-6

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